

Candidate Name	Centre Number	Candidate Number
		2



**GCE AS/A level**

1072/01

**BIOLOGY – BY2**

P.M. TUESDAY, 18 January 2011

1½ hours

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	6	
2	9	
3	5	
4	11	
5	11	
6	11	
7	7	
8	10	
Total	70	

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

The quality of written communication will affect the awarding of marks.

1. (a) Name the route that water takes when it passes through plant tissues via the cell walls. [1]  
.....
- (b) As the size of an organism increases which ratio decreases? [1]  
.....
- (c) An organism that manufactures its own food from inorganic chemicals is called an [1]  
.....
- (d) What is the role of the intercostal muscles in the thorax of a mammal? [1]  
.....
- (e) Give **two** advantages to a mammal of having internal lungs. [2]  
.....  
.....

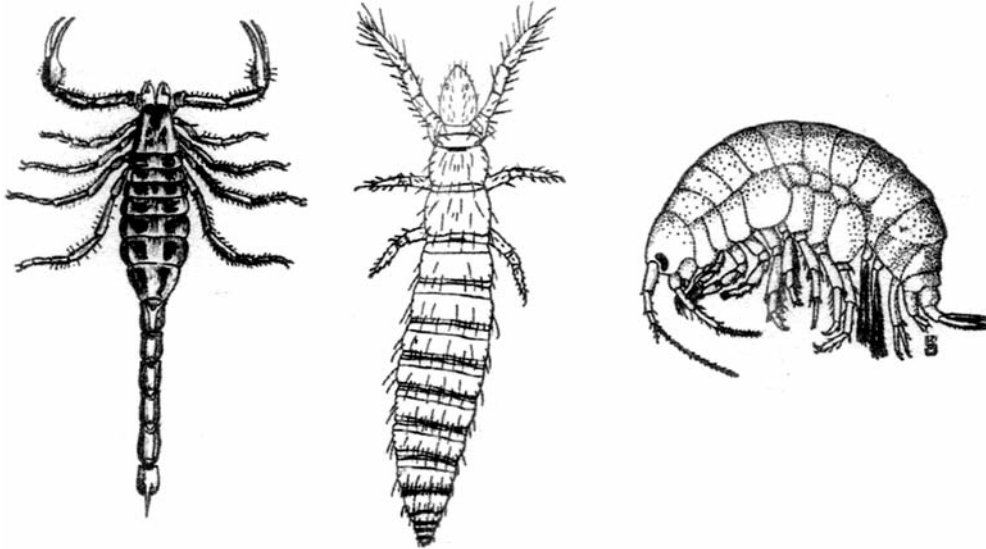
**(Total 6 marks)**

2. The table below lists various features of the human alimentary canal. Tick (✓) the boxes to show the region(s) where each feature occurs.

<i>Feature</i>	<i>Mouth</i>	<i>Stomach</i>	<i>Duodenum</i>	<i>Ileum</i>	<i>Large Intestine</i>
Villi present					
Site of mechanical breakdown of food					
Connects with bile duct					
Microorganisms secrete vitamins					
Carbohydrate digestion takes place					
pH 2-3					
Brunner's glands secrete alkaline fluid					
Main region of water absorption					
Protein digestion begins					

(Total 9 marks)

3. The animals in the diagram below belong to the phylum Arthropoda.



- (a) Apart from having an exoskeleton, name **two** other features **that you can see in the diagram** that members of the Arthropoda have in common. [2]

.....

.....

- (b) Give **one** advantage and **one** disadvantage of an exoskeleton. [2]

Advantage .....

.....

Disadvantage .....

.....

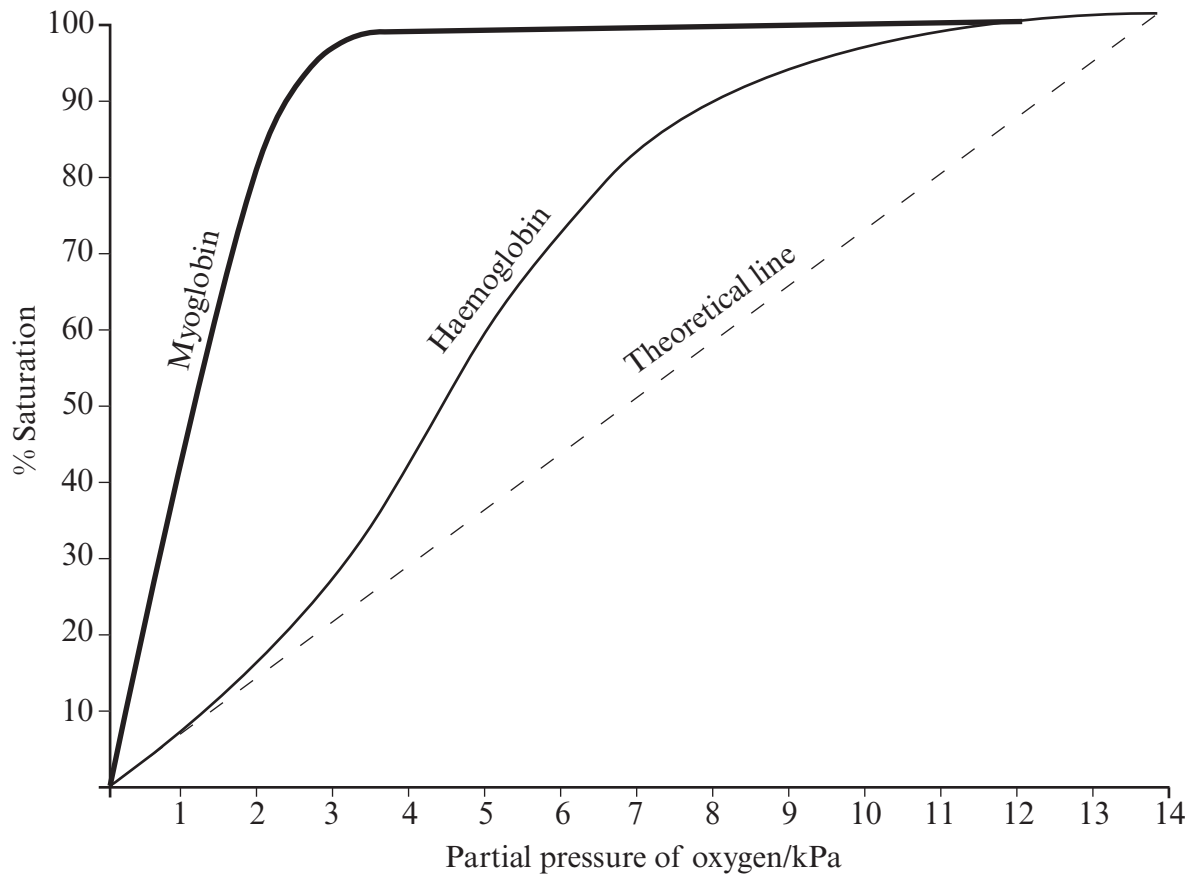
- (c) Each of the animals above belongs to one of the four main sub-groups of the Arthropoda. Name the taxonomic level of these sub-groups. [1]

.....

**(Total 5 marks)**

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4. The oxygen requirement of active muscle tissue is normally provided by oxyhaemoglobin. The diagram below shows the uptake of oxygen by haemoglobin at different partial pressures of oxygen. The dotted line represents a theoretical situation in which the rate of uptake was proportional to the concentration of oxygen.



- (a) List the **two** ways in which the shape of the haemoglobin dissociation line differs from the theoretical line. [2]

1. ....
2. ....

- (b) The partial pressure of oxygen in the lungs is usually about 13kPa and in muscle tissue usually below 5kPa.

Explain the biological significance of the differences between the haemoglobin dissociation line and the theoretical line:

- (i) at a partial pressure of 13kPa; [1]

.....

.....

- (ii) at a partial pressure of 4kPa; [1]

.....

.....

- (iii) when the partial pressure changes from 8kPa to 5kPa. [1]

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- (c) Describe how oxygen is released from the haemoglobin molecule. [3]

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- (d) The other dissociation curve on the diagram is for a myoglobin molecule. Suggest how myoglobin can perform a useful function in muscle tissue. [3]

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**(Total 11 marks)**

5. (a) Define the term *parasite*.

[2]

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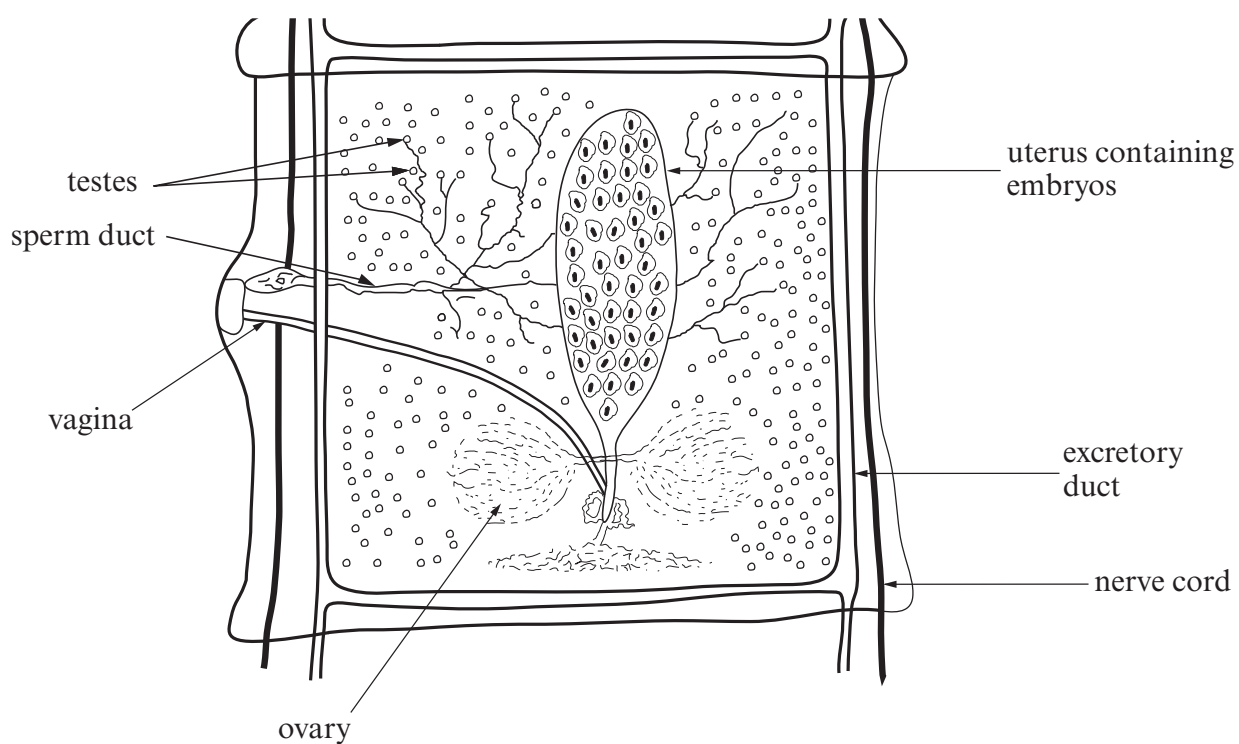
(b) Name **two** characteristics of tapeworms which are adaptations to their parasitic life. [2]

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.....

The diagram below shows one segment of a tapeworm found in the human gut. All segments in the body are identical.



- (c) (i) One organ system found in almost all animals is absent from the tapeworm. By reference to the diagram, name this system. [1]

.....

- (ii) How does the animal survive without this system? [2]

.....

.....

.....

- (d) (i) Name **two** features of the worm's reproductive system, shown in the diagram, which are adaptations to its parasitic existence. [2]

1. ....

2. ....

- (ii) Explain the importance of each of these features in the worm. [2]

1. ....

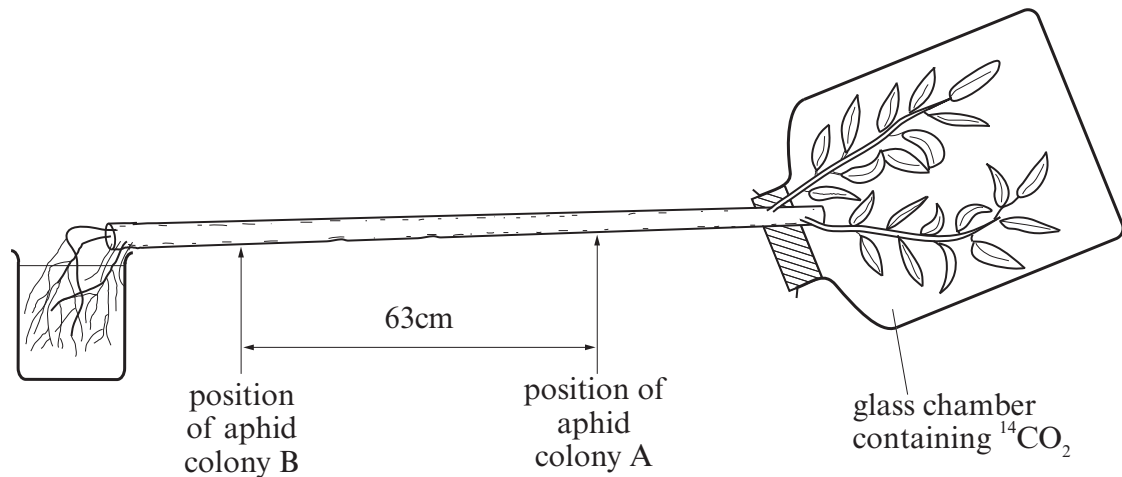
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2. ....

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**(Total 11 marks)**

6. The diagram shows an experiment in which the leaves of a plant were exposed to radioactive carbon dioxide. Two colonies of aphids (greenfly) were allowed to feed on the stem of the plant and their excreta was collected at regular intervals. This excreta was scanned for radioactivity.



- (a) Radioactivity was first recorded in colony A,  $2\frac{1}{2}$  hours after the start of the experiment. In colony B no radioactivity appeared until five hours after the start of the experiment. Calculate the rate of movement of the radioactive carbon along the stem. [3]

.....

.....

- (b) (i) Explain what is meant by the terms *source* and *sink*. [2]

.....

.....

.....

- (ii) Name a source and a sink shown in the diagram. [2]

.....

.....

- (c) (i) Name the radioactive molecule which was transported from source to sink. [1]

.....

- (ii) What is the name given to this form of transport in a plant? [1]

.....

- (d) Name the tissue and the type of cell where you would expect the greatest amount of radioactivity to be detected. [2]

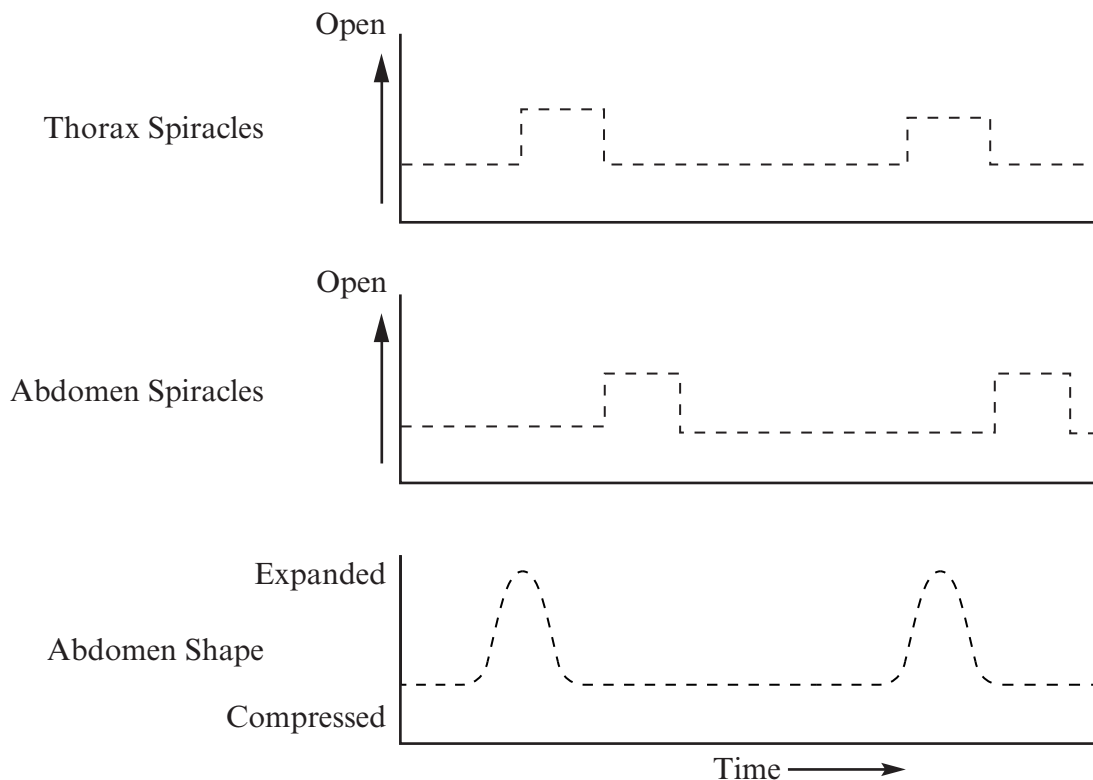
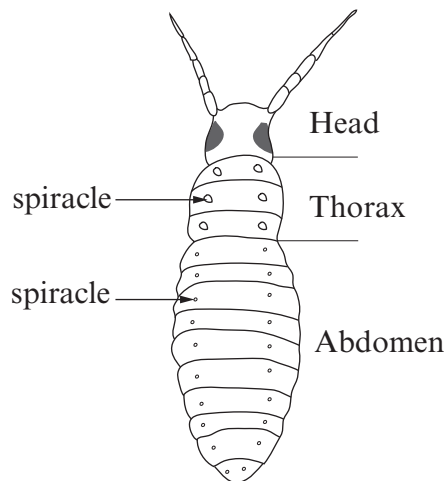
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**(Total 11 marks)**

7. The diagram represents the pattern of spiracles of an insect (legs and wings removed). The spiracles are openings into the continuous internal tracheal network which carries respiratory gases to and from the tissues. Each spiracle has a valve which can be closed or opened to control the flow of air into the body.

The graphs below the diagram show the opening and closing of the spiracles in the insect at rest and also how regular muscular movements stretch and contract the abdomen.



- (a) Compare the relationship between the movements of the thoracic spiracles and those in the abdomen. [2]

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- (b) (i) Describe, using the graph, how the change in shape of the abdomen is related to spiracle movements. [2]

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- (ii) Suggest how this ventilates the tracheal system. [2]

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- (c) The graph shows that there are long periods when the spiracles are closed. Explain why this is important for the insect's survival. [1]

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**(Total 7 marks)**

**Either,** (a) Describe the **structure** of the circulatory system in a mammal. [10]

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